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## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-215307

(43)Date of publication of application : 10.08.2001

(51)Int.Cl.

G02B 5/00

(21)Application number : 2000-021301

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(22)Date of filing : 31.01.2000

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## (54) ANTI-GLARE LAYER AND OPTICAL MEMBER

## (57)Abstract:

PROBLEM TO BE SOLVED: To develop an anti-glare layer which can prevent reflection of outside view without causing degradation of image definition, and excellent in resistance to scuffing.

SOLUTION: An optical member has an anti-glare layer in which transparent particulates having average particle diameter of 15  $\mu\text{m}$  or less are unevenly distributed in one side contacting air of a coating film having a thickness of 2 times or more of the average particle diameter of the transparent particulates, and thus formed a fine rugged structure on the surface, and the anti-glare layer on at least one side of a polarizing plate or an elliptically polarizing plate. Various kinds of display devices, such as a liquid crystal display device excellent in a display quality level without lowering the definition of an image with high definition by miniaturizing pixel size or the like, are obtained.

## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the  
examiner's decision of rejection or application  
converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of  
rejection][Date of requesting appeal against examiner's decision  
of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]

[Claim 1] An anti glare layer characterized by it being unevenly distributed in one side which contacts air in a coat in which a transperance particle with a mean particle diameter of 15 micrometers or less has mean particle diameter twice [ more than ] the thickness of the, and coming to form detailed irregularity structure in a front face.

[Claim 2] An anti glare layer which a bright film base material comes to support in claim 1.

[Claim 3] An optical member characterized for an anti glare layer according to claim 1 or 2 by thing of a polarizing plate or a elliptically-polarized-light board which it has in one side at least.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the suitable anti glare layer for reflected prevention of a view the outside in various indicating equipments.

[0002]

[Background of the Invention] That to which various kinds of detailed irregularity sides are established, and it was made to carry out scatter reflection of the outdoor daylight as an anti glare layer prepared on the surface of a screen etc. for the purpose of preventing check-by-looking active jamming of the image by the scene by the outdoor daylight of a fluorescent lamp being reflected in various displays, such as CRT, a plasma display, and a liquid crystal display, conventionally was known. However, with high-definition-izing by highly-minute-izing, flat-panel-izing, etc. of the image by the miniaturization of the latest pixel size, in the conventional anti glare layer, deterioration of display grace, like an image becomes coarse is large, and the more fine anti glare layer is called for.

[0003]

[The technical technical problem of invention] In view of the above, this invention persons tried formation of the surface irregularity structure by the particle more detailed than before. However, in order to form the surface detailed irregularity structure by projection of a particle in that case, it became clear that the difficulty which produces the need of making thickness of a coat thin, and a coat carries out on-the-strength lowering, becomes scarce at abrasion-proof nature, and becomes easy to produce with [ of a front face ] a blemish was induced. This invention makes a technical problem development of the anti glare layer which can prevent reflected [ a view ] outside without lowering of image clear nature in view of it, and is excellent also in abrasion-proof nature.

[0004]

[Means for Solving the Problem] This invention is unevenly distributed in one side which contacts air in a coat in which a transparence particle with a mean particle diameter of 15 micrometers or less has mean particle diameter twice [ more than ] the thickness of the, and offers an optical member characterized for an anti glare layer characterized by coming to form detailed irregularity structure in a front face, and its anti glare layer by thing of a polarizing plate or a elliptically-polarized-light board which it has in one side at least.

[0005]

[Effect of the Invention] The anti glare layer which can prevent reflected [ a view ] effectively outside, without reducing the clear nature of the high definition image by the miniaturization of pixel size etc. according to this invention, is excellent in a film strength, shows good abrasion-proof nature, and is hard to produce with a blemish on a front face can be obtained, and various kinds of displays, such as a liquid crystal display which is excellent in display grace, such as visibility, using the optical member which applied it, can be obtained.

[0006]

[Embodiment of the Invention] The anti glare layer by this invention consists of that by which the transparence particle with a mean particle diameter of 15 micrometers or less was unevenly distributed in one side which contacts air in the coat which has mean particle diameter twice [ more than ] the thickness of the, and formed detailed irregularity structure in the front face. This anti glare layer can be obtained by forming the resin layer of transparence particle content for example, etc.

[0007] concomitant use resin, such as an organic system particle which consists of a silica, an alumina, a titania and a zirconia, tin oxide, indium oxide and cadmium oxide, antimony oxide, etc. as a transparence particle, for example and which a conductive thing also becomes from the polymer for which a bridge is not constructed [ a certain inorganic system particle, bridge formation, or ], etc. -- an insoluble proper thing -- one sort -- or two

or more sorts can be used. What is excellent in transparency above all is desirable.

[0008] 15 micrometers or less of 0.1-10 micrometers of mean particle diameter of the transparency particle to be used are especially set to 0.5-6 micrometers above all from the point used as the anti glare layer which forms the surface detailed irregularity structure where the clear nature of the high definition image by the miniaturization of pixel size etc. is not reduced, and can prevent reflected [ a view ] effectively outside.

[0009] the proper thing which is excellent in transparency or a degree of hardness as transparency resin for making a transparency particle contain -- one sort -- or two or more sorts can be used. Incidentally as the example, the resin hardened by \*\*\*\*\*, ultraviolet rays, etc. of acetate system resin, carbonate system resin, ant rate system resin and sulfone system resin, the polyester system resin like polyethylene terephthalate or polyethylenenaphthalate, polyether sulphone system resin and polyamide system resin, polyimide system resin and styrene resin, the olefin system resin like annular polyolefine and acrylic resin or acrylic and an urethane system, an acrylic urethane system and an epoxy system, and a silicone system is raised. A front face gets damaged and hardening mold resin is preferably used rather than the point of abrasion-proof nature, such as rebound ace court nature aiming at prevention etc.

[0010] The proper method according to resin types, such as the method which film-izes the transparency resin which blended for example, the transparency particle by the method with a proper extrusion-molding method etc., the method which carries out coating desiccation of the liquid of the transparency resin which blended the transparency particle, and form a coat film, and the method which blended and carried out the coating of the transparency particle to the monomer system resin in the case of hardening mold resin and which carry out back hardening processing, etc. can perform formation of an anti glare layer. Although the amount of the transparency particle used can be determined outside more suitably than points, such as the reflected tightness of a view, generally let it above all be 2 - 40 weight section, especially 5 - 30 weight section below 50 weight sections per transparency resin 100 weight section.

[0011] It is required to form as a coat which has mean particle diameter twice [ more than ] the thickness of the transparency particle used in this invention in the above. By under 2 double, this thickness is insufficient for a film strength, and becomes scarce at abrasion-proof nature. 2.1 or more times of the mean particle diameter of the transparency particle used for coat thickness more desirable than points, such as abrasion-proof nature and thin-shape-izing, -- above all -- 2.2 to 5 times -- especially -- 2.5 to 4 times -- it is .

[0012] Moreover, the aforementioned coat needs to be unevenly distributed in one side to which a transparency particle contacts air in it, and to form detailed irregularity structure in a front face. With the structure which the transparency particle distributed uniformly in the coat, the clear nature of a transparency image falls by the scattered reflection in the interface of a particle and a coat, and the quality of a clear image deteriorates. An anti glare layer more desirable than points, such as clear image nature, is as much as possible unevenly distributed in one side to which a transparency particle contacts air in the state of a monolayer array in a coat. This maldistribution structure can be efficiently formed with the method which uses a transparency particle in the air.

[0013] An anti glare layer can prepare one layer or more than two-layer in the proper part in the front face of a display etc. by the method with proper method directly formed in the display for application, method which forms a display and which is directly formed, for example in members, such as a polarizing plate and a elliptically-polarized-light board, method formed in the member which forms direct or a display in a display as an anti-dazzle sheet given to the front face of a bright film base material.

[0014] What consists of one sort of proper things, such as transparency resin illustrated in the above-mentioned anti glare layer, or two sorts or more as a bright film base material which supports an anti glare layer in the above can be used, and there is especially no definition about the formation resin. What consists of resin which is excellent in transparency, a mechanical strength and thermal stability, a water resisting property, etc. above all is desirable.

[0015] The thickness of a bright film base material can be suitably determined according to reinforcement, light transmittance, etc. Especially generally let 10-300-micrometer 500 micrometers or less above all be the thickness of 15-200 micrometers from points, such as thin lightweight nature. In addition, proper processing of corona treatment, UV irradiation processing, plasma treatment, sputter etching processing, under coat processing, etc., etc. can be performed to the front face of a bright film base material for the purpose of improvement in the adhesion force of the layer attached to it etc.

[0016] The proper thing used for formation of liquid crystal displays, such as what protected a polarization film and it by transparent protection layer, and a thing which carried out the laminating of the phase contrast board to it, etc. as the polarizing plate or elliptically-polarized-light board of the object which, on the other hand,

attaches the above-mentioned anti glare layer as an anti-dazzle sheet if needed can be used, and there is especially no definition about the class.

[0017] Incidentally as an example of said polarization film, the polyene oriented film like the thing and the dehydration processing object of polyvinyl alcohol which iodine and/or dichromatic dye were made to stick to the hydrophilic high polymer film like a polyvinyl alcohol system film, a partial formal-ized polyvinyl alcohol system film, and an ethylene-vinylacetate copolymer system partial saponification film, and were extended, or the demineralization acid-treatment object of a polyvinyl chloride etc. is raised. Moreover, using proper things, such as transporence resin illustrated in the above-mentioned anti glare layer, although the transparent protection layer prepared in one side or the both sides of a polarization film if needed considered as the spreading method or the film, it can be formed by the method with a proper laminating method etc.

[0018] What supported a polycarbonate, polyvinyl alcohol and polystyrene, polymethylmethacrylate and polypropylene, other polyolefines, the birefringence film that comes to carry out drawing processing of the film which consists of proper polymer like polyarylate or a polyamide, the liquid crystal polymer which carried out orientation processing, and its orientation layer with the bright film base material as an example of the phase contrast board for carrying out a laminating to a polarizing plate and obtaining a elliptically-polarized-light board is raised. A phase contrast board may carry out the laminating of two or more sorts of phase contrast films etc., and may control optical properties, such as phase contrast.

[0019] As described above, an anti glare layer is prepared in one side or the both sides of a bright film base material, a polarizing plate, and a elliptically-polarized-light board, can prepare one layer or more than two-layer in the proper location of a display, but on the occasion of application to the display, where an optical layer with a proper acid-resisting layer etc. is attached, it is also applicable. It is also the same as when an anti glare layer is prepared in a proper member and it considers as an optical member.

[0020] The acid-resisting layer incidentally described above can be formed on an anti glare layer as an interference film which consists of a coat film of low refraction materials, such as a multilayer coat film of an inorganic oxide, and a fluorine system compound, with which it is prepared for the purpose of control of a surface echo of outdoor daylight, for example, refractive indexes differ. Moreover, when it considers as the acid-resisting layer in which the detailed irregularity structure in an underside was made to reflect by the coat method with proper vacuum evaporatio methods, such as vacuum deposition method, and an ion plating method, a sputtering method, plating method, sol gel method, etc. for example, it shall serve as an anti glare layer.

[0021] Furthermore, a transporence conductive layer can also be prepared in an anti glare layer or an optical member for the purpose of electrification prevention, electric shielding of an electromagnetic wave, etc. A transporence conductive layer can prepare one layer or more than two-layer in the part where the interior of the layer which forms a bright film base material or an optical member and a front face are proper. A method with proper coating method of for example, transporence conductive coating material, the vacuum deposition method and sputtering method of an electrical conducting material, an ion plating method and a chemical-vacuum-deposition method, a spray pyrolysis method and a chemical-plating method, electroplating method, method that combined them can perform formation of a transporence conductive layer.

[0022] what has indium oxide, the tin oxide, an indium and a tin mixed oxide and cadmium oxide, titanium oxide and an indium, tin metallurgy, silver and platinum, palladium and copper, aluminum and nickel, chromium and titanium, iron and cobalt, copper iodide, those alloys, etc. proper to the aforementioned electrical conducting material -- one sort -- or two or more sorts can be used, and there is especially no definition and it can use all of a well-known object.

[0023] Furthermore, a fluorine system surface treatment coat can also be established in the front face of an anti glare layer or an optical member for the purpose of making easy to wipe away the dirt which made it hard to adhere dirt, such as a fingerprint, and adhered etc. The proper fluorine system compound which can form the small film of surface energy, such as for example, fluorine system resin and a fluorine system silane coupling agent, can be used for formation of the coat.

[0024] In addition, the adhesive layer aiming at adhesion to other members can also be prepared in one side of an anti-dazzle sheet or an optical member or both sides, especially the field that does not have an anti glare layer. The binder which makes base polymer proper polymer, such as for example, an acrylic polymer, silicone system polymer and polyester, polyurethane and a polyether, and synthetic rubber, can be used for formation of the adhesive layer, and there is especially no definition in it. Above all, like an acrylic binder, what is excellent in optical transparency and shows adhesion properties, such as coherent [ moderate wettability and coherent / moderate ], and an adhesive property, is desirable, and especially the thing that is excellent in weatherability,

thermal resistance, etc. in addition to it is desirable.

[0025] As the example of the aforementioned acrylic binder incidentally, What makes base polymer that to which carbon numbers, such as a methyl group, an ethyl group, and butyl, an ethylhexyl radical, copolymerized one sort of proper monomer components other than acrylic-acid system alkyl ester or two sorts or more for the purpose of refining of an adhesion property etc. if needed in the acrylic polymer which used for the principal component one sort of the alkyl ester of the acrylic acid which has 20 or less alkyl group (meta), or two sorts or more, or it is raised.

[0026] A method with proper method which attaches for example, binder liquid directly on a bright film base material etc. by proper expansion methods, such as a flow casting method and a coating method, or method which forms an adhesive layer on a separator according to the above, and carries out transfer of it on a bright film base material etc. can perform the attachment of the adhesive layer to a bright film base material, an optical member, etc. The thickness of an adhesive layer can be suitably determined according to adhesive strength etc., and, generally is set to 1-500 micrometers.

[0027] It can also consider as the adhesive layer which can blend the resin of a natural product or a compost, and proper additives, such as adhesive grant resin, a bulking agent, a pigment and a coloring agent, and an antioxidant, with an adhesive layer above all if needed, for example, blends a transparency particle with it, and shows optical diffusibility. Moreover, an adhesive layer can also be prepared as a superposition layer of things, such as a different presentation or a class. When an adhesive layer is exposed to a front face, it is desirable to carry out coat protection of the front face with a separator etc. until it presents practical use.

[0028] In addition, ultraviolet absorption ability can also be given to an anti glare layer, and a bright film base material and an optical member with the method processed with ultraviolet ray absorbents, such as for example, a salicylate system compound, a benzophenone system compound, a benzotriazol system compound, and a cyanoacrylate system compound, a nickel complex salt system compound. The anti glare layer and optical member by this invention are applicable to various displays, such as CRT, a plasma display, and a liquid crystal display.

[0029]

[Example] The polyfunctional acrylic monomer 100 section of an example 1 ultraviolet-curing mold (weight section) the following -- being the same -- dispersion liquid of 40 % of the weight of solid content concentration which blended the hollow transparency particle 15 section with a mean particle diameter of 2.5 micrometers, the photopolymerization initiator 3 section, and an organic solvent, and was mixed with the homogenizer were applied to one side of a triacetyl cellulose film with a thickness of 50 micrometers in bar coater #20, hardening processing was carried out by ultraviolet rays through the high pressure mercury vapor lamp, the anti glare layer whose thickness of a hardening coat is 7 micrometers was formed, and the anti-dazzle sheet was obtained.

[0030] When the cross section of the above mentioned anti-dazzle sheet was observed by SEM, it was unevenly distributed in the condition that the particle arranged by the monolayer to the air side interface, and detailed irregularity structure was formed in the front face by the particle. Moreover, the place which investigated the surface hardness of the anti glare layer of an anti-dazzle sheet was good, and it excelled in abrasion-proof nature. When the anti glare layer is furthermore applied for an anti-dazzle sheet to the color TFT-liquid-crystal indicating equipment of high clear image quality as a front-face side, lowering is not accepted in the clear nature of an image, but there is reflected [ no / a view ] outside, and it excelled also in the anti-dazzle effect.

[0031] Changed into the example of comparison 1 hollow particle, and the spherical particle was used, and also the anti glare layer was formed according to the example 1, and the anti-dazzle sheet was obtained. The particle was distributing this anti-dazzle sheet uniformly in the coat by SEM observation of that cross section, the front face was smooth and concavo-convex structure was not formed. Moreover, although the place which investigated the surface hardness of the anti glare layer of an anti-dazzle sheet was good and being excelled in abrasion-proof nature, in application to the color TFT-liquid-crystal display of high clear image quality, the clear nature of an image fell and it produced reflected [ a view ] outside.

[0032] Applied by example of comparison 2 bar coater #6, and thickness of a hardening coat was set to 3 micrometers, and also the anti glare layer was formed according to the example 1, and the anti-dazzle sheet was obtained. Although concavo-convex structure was formed in the front face by the particle which the particle arranged by the monolayer to the air side interface by SEM observation of that cross section, and projected from the coat and the reflected tightness of a view was also good the clear nature of an image, and outside, when this anti-dazzle sheet investigated the surface hardness of an anti glare layer, it was lacking in abrasion-proof nature.

[Translation done.]



(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開2001-215307

(P2001-215307A)

(43) 公開日 平成13年8月10日 (2001.8.10)

(51) Int.Cl.<sup>7</sup>

G 0 2 B 5/00

識別記号

F I

G 0 2 B 5/00

テマコード\* (参考)

B 2 H 0 4 2

審査請求 未請求 請求項の数 3 O L (全 4 頁)

(21) 出願番号 特願2000-21301 (P2000-21301)

(22) 出願日 平成12年1月31日 (2000.1.31)

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(54) 【発明の名称】 アンチグレア層及び光学部材

(57) 【要約】

【課題】 画像鮮明性の低下なく外景の映り込みを防止  
できて耐擦傷性にも優れるアンチグレア層の開発。

【解決手段】 平均粒径15  $\mu$ m以下の透明微粒子がそ  
の平均粒径の2倍以上の厚さを有する皮膜中で空気と接  
触する片側に偏在して表面に微細凹凸構造を形成してな  
るアンチグレア層及びそのアンチグレア層を偏光板又は  
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【効果】 画素サイズの小型化等による高精細な画像の  
鮮明性を低下させず表示品位に優れる液晶表示装置など  
の各種の表示装置が得られる。

## 【特許請求の範囲】

【請求項1】 平均粒径15 $\mu\text{m}$ 以下の透明微粒子がその平均粒径の2倍以上の厚さを有する皮膜中で空気と接触する片側に偏在して表面に微細凹凸構造を形成してなることを特徴とするアンチグレア層。

【請求項2】 請求項1において、透明フィルム基材に支持されてなるアンチグレア層。

【請求項3】 請求項1又は2に記載のアンチグレア層を偏光板又は楕円偏光板の少なくとも片側に有することを特徴とする光学部材。

## 【発明の詳細な説明】

## 【0001】

【発明の技術分野】本発明は、各種表示装置における外景の映り込み防止に好適なアンチグレア層に関する。

## 【0002】

【発明の背景】従来、CRTやプラズマディスプレイや液晶表示装置等の各種表示装置において蛍光灯の外光による景色が映り込むことによる画像の視認妨害を防止することを目的に画面の表面などに設けられるアンチグレア層としては、各種の微細凹凸面を設けて外光を散乱反射させるようにしたものが知られていた。しかしながら最近の画素サイズの小型化による画像の高精細化やフラットパネル化等による高品位化に伴い、従来のアンチグレア層では画像が粗くなるなどの表示品位の低下が大きく、より木目の細かいアンチグレア層が求められている。

## 【0003】

【発明の技術的課題】前記に鑑みて本発明者らは、従来よりも微細な粒子による表面凹凸構造の形成を試みた。しかしその場合、微粒子の突出による表面微細凹凸構造を形成するために皮膜の厚さを薄くする必要を生じ皮膜が強度低下して耐擦傷性に乏しくなり表面の傷付きが生じやすくなる難点を誘発することが判明した。本発明は、それに鑑み画像鮮明性の低下なく外景の映り込みを防止できて耐擦傷性にも優れるアンチグレア層の開発を課題とする。

## 【0004】

【課題の解決手段】本発明は、平均粒径15 $\mu\text{m}$ 以下の透明微粒子がその平均粒径の2倍以上の厚さを有する皮膜中で空気と接触する片側に偏在して表面に微細凹凸構造を形成してなることを特徴とするアンチグレア層、及びそのアンチグレア層を偏光板又は楕円偏光板の少なくとも片側に有することを特徴とする光学部材を提供するものである。

## 【0005】

【発明の効果】本発明によれば、画素サイズの小型化等による高精細な画像の鮮明性を低下させることなく外景の映り込みを有効に防止でき、皮膜強度に優れ良好な耐擦傷性を示して表面に傷付きが生じにくいアンチグレア層を得ることができ、それを適用した光学部材を用いて

視認性等の表示品位に優れる液晶表示装置などの各種の表示装置を得ることができる。

## 【0006】

【発明の実施形態】本発明によるアンチグレア層は、平均粒径15 $\mu\text{m}$ 以下の透明微粒子がその平均粒径の2倍以上の厚さを有する皮膜中で空気と接触する片側に偏在して表面に微細凹凸構造を形成したものよりなる。かかるアンチグレア層は、例えば透明微粒子含有の樹脂層を形成するなどにより得ることができる。

10 【0007】透明微粒子としては、例えばシリカやアルミナ、チタニアやジルコニア、酸化錫や酸化インジウム、酸化カドミウムや酸化アンチモン等からなる、導電性のこともある無機系粒子、架橋又は未架橋のポリマー等からなる有機系粒子などの、併用樹脂等に不溶性の適宜なものを1種又は2種以上用いることができる。就中、透明性に優れるものが好ましい。

20 【0008】用いる透明微粒子の平均粒径は、画素サイズの小型化等による高精細な画像の鮮明性を低下させない表面微細凹凸構造を形成して外景の映り込みを有効に防止できるアンチグレア層とする点より15 $\mu\text{m}$ 以下、就中0.1~10 $\mu\text{m}$ 、特に0.5~6 $\mu\text{m}$ とされる。

30 【0009】透明微粒子を含有させるための透明樹脂としては、透明性や硬度に優れる適宜なものを1種又は2種以上用いる。ちなみにその例としては、アセテート系樹脂やカーボネート系樹脂、アリレート系樹脂やスルホン系樹脂、ポリエチレンテレフタレートやポリエチレンナフタレートの如きポリエステル系樹脂、ポリエーテルスルホン系樹脂やポリアミド系樹脂、ポリイミド系樹脂やスチレン系樹脂、環状ポリオレフィンの如きオレフィン系樹脂やアクリル系樹脂、あるいはアクリル系やウレタン系、アクリルウレタン系やエポキシ系、シリコン系の如き熱や紫外線等で硬化する樹脂などがあげられる。表面の傷付き防止等を目的としたハードコート性などの耐擦傷性の点よりは硬化型樹脂が好ましく用いられる。

40 【0010】アンチグレア層の形成は、例えば透明微粒子を配合した透明樹脂を押し出し成形方式等の適宜な方式でフィルム化する方式、透明微粒子を配合した透明樹脂の液を塗工乾燥してコート膜を形成する方式、硬化型樹脂の場合にはそのモノマー系樹脂に透明微粒子を配合して塗工したのち硬化処理する方式などの樹脂タイプ等に応じた適宜な方式にて行うことができる。透明微粒子の使用量は、外景の映り込み防止性などの点より適宜に決定しうが一般には、透明樹脂100重量部あたり50重量部以下、就中2~40重量部、特に5~30重量部とされる。

50 【0011】前記において本発明にては用いた透明微粒子の平均粒径の2倍以上の厚さを有する皮膜として形成することが必要である。かかる厚さが2倍未満では皮膜強度に不足して耐擦傷性に乏しくなる。耐擦傷性や薄型

化等の点より好ましい皮膜厚は、用いた透明微粒子の平均粒径の2.1倍以上、就中2.2~5倍、特に2.5~4倍である。

【0012】また前記の皮膜は、その中で透明微粒子が空気と接触する片側に偏在して表面に微細凹凸構造を形成していることが必要である。透明微粒子が皮膜中に均等に分散した構造では微粒子と皮膜の界面における乱反射で透過画像の鮮明性が低下し、鮮明画像の品質が低下する。鮮明画像性等の点より好ましいアンチグレア層は、皮膜中で透明微粒子が空気と接触する片側に可及的に単層配列状態で偏在するものである。かかる偏在構造は、中空の透明微粒子を用いる方式などにより効率よく形成することができる。

【0013】アンチグレア層は、適用対象の表示装置に直接設ける方式、表示装置を形成する例えば偏光板や楕円偏光板等の部材に直接設ける方式、透明フィルム基材の表面に付与した防眩シートとして表示装置に直接又は表示装置を形成する部材に設ける方式などの適宜な方式で表示装置の表面等における適宜な箇所に1層又は2層以上を設けることができる。

【0014】前記においてアンチグレア層を支持する透明フィルム基材としては、上記のアンチグレア層で例示した透明樹脂などの適宜なものの1種又は2種以上からなるものを用いることができ、その形成樹脂について特に限定はない。就中、透明性及び機械的強度、熱安定性及び耐水性等に優れる樹脂からなるものが好ましい。

【0015】透明フィルム基材の厚さは、強度や光透過率などに応じて適宜に決定することができる。一般には薄型軽量性等の点より500 $\mu$ m以下、就中10~300 $\mu$ m、特に15~200 $\mu$ mの厚さとされる。なお透明フィルム基材の表面には、それに付設する層の密着力の向上等を目的にコロナ処理や紫外線照射処理、プラズマ処理やスパッタエッチング処理、アンダーコート処理等の適宜な処理を施すことができる。

【0016】一方、上記したアンチグレア層を必要に応じ防眩シートとして付設する対象の偏光板又は楕円偏光板としては、偏光フィルムやそれを透明保護層で保護したもの、それと位相差板を積層したものなどの液晶表示装置等の形成に使用される適宜なものをを用いることができ、その種類について特に限定はない。

【0017】ちなみに前記偏光フィルムの具体例としては、ポリビニルアルコール系フィルムや部分ホルマール化ポリビニルアルコール系フィルム、エチレン・酢酸ビニル共重合体系部分ケン化フィルムの如き親水性高分子フィルムにヨウ素及び／又は二色性染料を吸着させて延伸したもの、ポリビニルアルコールの脱水処理物やポリ塩化ビニルの脱塩酸処理物の如きポリエチン配向フィルムなどがあげられる。また偏光フィルムの片側又は両側に必要に応じて設ける透明保護層は、上記のアンチグレア層で例示した透明樹脂などの適宜なものをを用いて、塗布

方式やフィルムとしたものの積層方式などの適宜な方式で形成することができる。

【0018】偏光板と積層して楕円偏光板を得るための位相差板の例としては、ポリカーボネートやポリビニルアルコール、ポリスチレンやポリメチルメタクリレート、ポリプロピレンやその他のポリオレフィン、ポリアリレートやポリアミドの如き適宜なポリマーからなるフィルムを延伸処理してなる複屈折性フィルム、配向処理した液晶ポリマーやその配向層を透明フィルム基材で支持したものなどがあげられる。位相差板は、2種以上の位相差フィルム等を積層して位相差等の光学特性を制御したものであってもよい。

【0019】アンチグレア層は、上記したよう透明フィルム基材や偏光板、楕円偏光板の片側又は両側に設けて表示装置の適宜な位置に1層又は2層以上を設けうるが、その表示装置への適用に際しては、反射防止層等の適宜な光学層などを付設した状態で適用することもできる。アンチグレア層を適宜な部材に設けて光学部材とした場合も同様である。

【0020】ちなみに前記した反射防止層は、外光の表面反射の抑制を目的に設けられ、例えば屈折率の異なる無機酸化物の多層コート膜やフッ素系化合物等の低屈折材料のコート膜等からなる干渉膜などとしてアンチグレア層の上に形成することができる。また例えば真空蒸着方式やイオンブレーティング方式、スパッタリング方式等の蒸着方式、メッキ方式やゾルゲル方式などの適宜なコート方式で下面における微細凹凸構造を反映させた反射防止層とした場合にはアンチグレア層を兼ねるものとすることもできる。

【0021】さらにアンチグレア層や光学部材には、帯電防止や電磁波の遮蔽等を目的に透明導電層を設けることもできる。透明導電層は、透明フィルム基材又は光学部材を形成する層の内部や表面の適宜な箇所に1層又は2層以上を設けることができる。透明導電層の形成は、例えば透明導電塗料の塗工方式、導電材料の真空蒸着方式やスパッタリング方式、イオンブレーティング方式や化学蒸着方式、スプレー熱分解方式や化学メッキ方式、電気メッキ方式やそれらを組合せた方式などの適宜な方式にて行うことができる。

【0022】前記の導電材料には、例えば酸化インジウムや酸化スズ、インジウム・錫混合酸化物や酸化カドミウム、酸化チタンやインジウム、スズや金、銀や白金、パラジウムや銅、アルミニウムやニッケル、クロムやチタン、鉄やコバルト、ヨウ化銅やそれらの合金などの適宜なものを1種又は2種以上用いることができ特に限定はなく、公知物のいずれも用いる。

【0023】またさらにアンチグレア層や光学部材の表面には、指紋等の汚れを付着しにくくし、また付着した汚れを拭拭しやすくすることなどを目的にフッ素系表面処理コートを設けることもできる。そのコートの形成に

は、例えばフッ素系樹脂やフッ素系シランカップリング剤などの表面エネルギーの小さい膜を形成しうる適宜なフッ素系化合物を用いることができる。

【0024】加えて防眩シートや光学部材の片面又は両面、特にアンチグレア層を有しない面には他部材への接着を目的とした粘着層を設けることもできる。その粘着層の形成には、例えばアクリル系重合体やシリコン系ポリマー、ポリエステルやポリウレタン、ポリエーテルや合成ゴムなどの適宜なポリマーをベースポリマーとする粘着剤を用いることができ、特に限定はない。就中アクリル系粘着剤の如く光学的透明性に優れ、適度な濡れ性と凝集性と接着性等の粘着特性を示すものが好ましく、それに加えて耐候性や耐熱性などにも優れるものが特に好ましい。

【0025】ちなみに前記のアクリル系粘着剤の例としては、メチル基やエチル基、ブチル基やエチルヘキシル基等の炭素数が20以下のアルキル基を有する(メタ)アクリル酸のアルキルエステルの1種又は2種以上を主成分に用いたアクリル系重合体やそれに必要に応じて粘着特性の改質等を目的にアクリル酸系アルキルエステル以外の適宜なモノマー成分の1種又は2種以上を共重合したものをベースポリマーとするものなどがあげられる。

【0026】透明フィルム基材や光学部材等への粘着層の付設は、例えば粘着剤液を流延方式や塗工方式等の適宜な展開方式で透明フィルム基材等の上に直接付設する方式、あるいは前記に準じセパレータ上に粘着層を形成してそれを透明フィルム基材等の上に移着する方式などの適宜な方式で行うことができる。粘着層の厚さは、接着力等に応じて適宜に決定でき一般には1~500 $\mu$ mとされる。

【0027】粘着層には、必要に応じて例えば天然物や合成物の樹脂類、就中、粘着性付与樹脂、充填剤や顔料、着色剤や酸化防止剤などの適宜な添加剤を配合でき、透明粒子を配合して光拡散性を示す粘着層とすることもできる。また粘着層は、異なる組成又は種類等のものの重畳層として設けることもできる。粘着層が表面に露出する場合には、実用に供するまでの間その表面をセパレータなどで被覆保護しておくことが好ましい。

【0028】なおアンチグレア層や透明フィルム基材、光学部材には、例えばサリチル酸エステル系化合物やベンゾフェノン系化合物、ベンゾトリアゾール系化合物や\*

\*シアノアクリレート系化合物、ニッケル錯塩系化合物等の紫外線吸収剤で処理する方式などにより紫外線吸収能をもたせることもできる。本発明によるアンチグレア層や光学部材は、CRTやプラズマディスプレイや液晶表示装置等の各種表示装置に適用することができる。

【0029】

【実施例】実施例1

紫外線硬化型の多官能アクリル系モノマー100部(重量部、以下同じ)に平均粒径2.5 $\mu$ mの中空透明微粒子15部、光重合開始剤3部及び有機溶剤を配合してホモジナイザーで混合した固形分濃度40重量%の分散液を厚さ50 $\mu$ mのトリアセチルセルロースフィルムの片面にバーコータ#20にて塗布し高圧水銀灯を介し紫外線で硬化処理して硬化皮膜の厚さが7 $\mu$ mのアンチグレア層を形成して防眩シートを得た。

【0030】前記した防眩シートの断面をSEMで観察したところ、微粒子が空気側界面に単層で配列した状態に偏在しており、その微粒子にて表面に微細凹凸構造が形成されていた。また防眩シートのアンチグレア層の表面硬度を調べたところ良好で耐擦傷性に優れていた。さらに防眩シートを高鮮明画質のカラーTF T液晶表示装置にそのアンチグレア層を表面側として適用したところ画像の鮮明性に低下は認められず、外景の映り込みもなく防眩効果にも優れていた。

【0031】比較例1

中空微粒子に変えて、球状微粒子を用いたほかは実施例1に準じアンチグレア層を形成して防眩シートを得た。この防眩シートは、その断面のSEM観察で微粒子が皮膜中に均等に分散しており、表面は平滑で凹凸構造が形成されていなかった。また防眩シートのアンチグレア層の表面硬度を調べたところ良好で耐擦傷性には優れていたが、高鮮明画質のカラーTF T液晶表示装置への適用では画像の鮮明性が低下し、外景の映り込みも生じた。

【0032】比較例2

バーコータ#6で塗布して硬化皮膜の厚さを3 $\mu$ mとしたほかは実施例1に準じアンチグレア層を形成して防眩シートを得た。この防眩シートは、その断面のSEM観察で微粒子が空気側界面に単層で配列し皮膜より突出した微粒子で表面に凹凸構造が形成されて画像の鮮明性や外景の映り込み防止性も良好であったがアンチグレア層の表面硬度を調べたところ耐擦傷性に乏しかった。

フロントページの続き

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Fターム(参考) 2H042 AA09 AA26